

Tension Band Wire Fixation for Comminuted Distal Clavicle Fracture

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Purpose: The purpose of this retrospective study is to review clinical and radiologic results of K-wire fixation and tension band wiring to fix the fracture fragments in distal clavicle Neer type II or III fractures.

Materials and Methods: From Jan. 1996 to Jan. 2002, eleven patients with distal clavicle Neer type II fracture and three patients with distal clavicle type III fracture were treated by open reduction and internal fixation with K-wires and tension band wiring. The clinical results were analyzed according to the functional criteria by Kona et al.

Results: All fractures healed at 8.5 weeks in average. There were thirteen excellent and one good results. The most common complication was pin site protrusion, which did not affect the clinical results.

Conclusion: K-wire fixation and tension band wire is an effective method of fixation for distal clavicle Neer type II or III fractures.

Key Words: Distal clavicle, Comminuted fracture, Tension band wiring

Neer 2,3 가
가 2
가 가 가
가 1,2-5 , K-
가
14
1996 1 2002 1 Neer⁶ 2
3 1
가 14
Neer Rook wood
(Fig. 1A, Fig. 1B). Rook wood
IIa 6 , IIb 5 ,
Neer 3 3
18 61 40 , 8 , 6
가 7 , 가 1 가 6 ,
가 3 ,
1 (Table 1).
가 가
K-
가
(Fig.2). 14 가
2
가 3 ,

1232

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가 2
가
가
2 (Fig.3)
가 3 (Fig.4). 3.6 velpeau 8.4 (; 7 ~ 10)
(cephalic tilt) 7.8 (5 ~ 10) Kona
가 13
가 , 1 10
가 Kona 7 가
(Table 2). 3

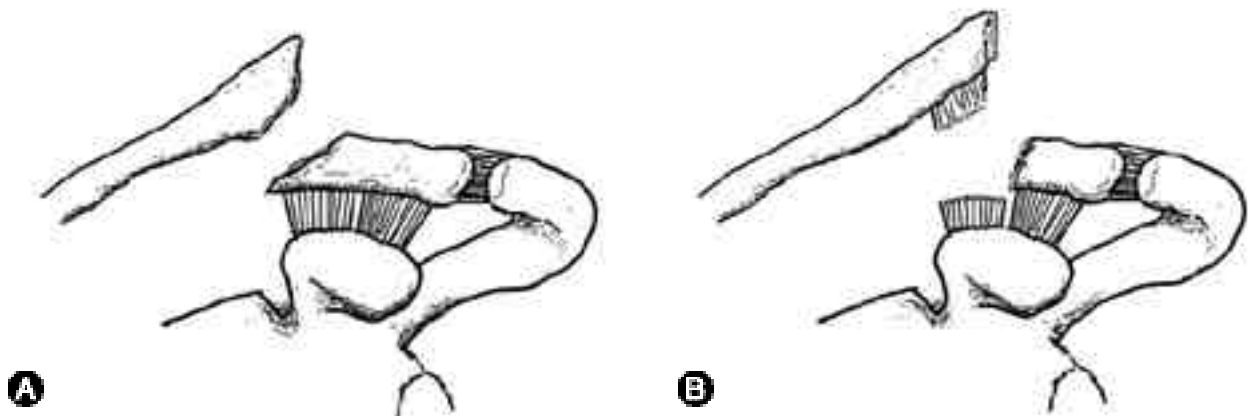


Fig 1. (A)Rockwood classification of distal clavicle fracture IIa : both the conoid and the trapezoid ligaments remain attached to the distal fragment.(B)Rockwood classification of distal clavicle fracture IIb: medial fragment instability is a result of disruption

Table 1. Dermographic data of the patients

No.	Sex/Age	Neer classification	Method of fixation	Combined injury	Union (Week)	Functional score
1	M/52	a	C.TBW*		8	Excellent
2	F/18	a	D.TBW [†] +miniscrew		9	Excellent
3	F/43	b	TBW		8	Excellent
4	M/47		C.TBW	AC separation	7	Excellent
5	M/49	a	T.A.TBW [‡]		9	Excellent
6	F/26	a	C.TBW		9	Excellent
7	M/42	b	TBW		8	Excellent
8	F/27	a	TBW	AC separation	8	Excellent
9	M/52		TBW+miniscrew		10	Excellent
10	M/40		D.TBW	AC separation	9	Excellent
11	M/35	b	D.TBW		8	Excellent
12	F/36	b	TBW		8	Excellent
13	F/61	b	T.A.TBW	Fx. radius	8	Good
14	M/36	a	TBW		9	Excellent

C.TBW* : circumferential tension band wiring

D.TBW[†]: double tension band wiring

T.A.TBW[‡] : transacromial tension band wiring

Fx. radius: fracture distal radius

AC : acromio-clavicular joint

1
4
8
120
가 가
Neer²⁻⁶
가
가
가
Rookwood
가
IIa
가 IIb
(Fig. 1A, Fig. 1B).
II
Nordqvist³ 22%
, Edwards⁸ 45%
Neer II
8-10
가
가 K-^{2,7}
Steinmann pin⁸ Knowle's pin¹⁰
, T-
11
5, PDS¹
Dacron tape¹²
가
Neer⁶ K-
Kona⁷ 13 5 6
. Craig¹⁰ Knowle's pin
K-
Hessmann¹
T-plate
가



Fig. 2. Intraoperative finding of tension band wiring.

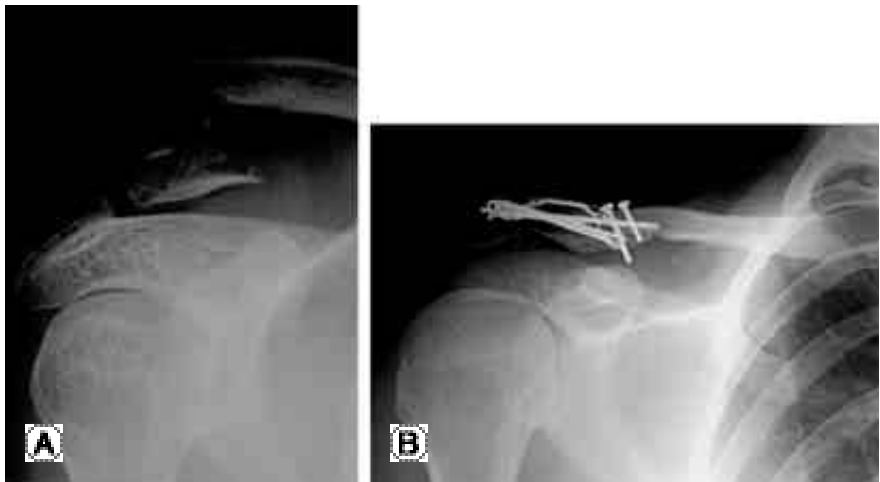


Fig. 3. (A)Roentgenogram of 18 years old female showed Neer type Iia clavicle fracture and (B)she was treated by double tension band wiring and miniscrew fixation.

Edward⁸ K
 Steinmann pin
 가
 Yamaguchi⁵
 가 가 가 3
 Goldberg¹² II 9 10
 Dacron tape 1
 가 가 K-
 Kao¹¹ 12 K
 12
 11 , Chun⁹ 19 Neer II III 가
 가 가 K-
 가
 Neer II 가
 11 III 3 가
 1



Fig. 4. (A)Preoperative shoulder anteroposterior view of 47 years old man showed type III fracture. (B)He was treated by circumferential tension band wiring because of comminution with small fragment.(C)Roentgenogram after removal of wires at postoperative 8 months.

Table 2. Classification of functional results by Kona et al

Excellent	Patients were asymptomatic and capable of unrestricted use of extremity
Good	Patients were able to resume their former occupation but complained of a mild non-debilitating reduction in motion, loss of strength, or pain
Fair	Patients had persistent discomfort, weakness, or loss of motion significant enough to interrupt the patients preferred lifestyle on a daily basis but still allow the patient to pursue most desired activities or remain at his preinjury employment status, with little or no modification of work requirements
Poor	Patients had a residual disability causing a significant alteration in their work or lifestyle

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